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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/600,847
Filing Date: June 20, 2003
Appellant(s): HONG ET AL.

Alex R. Sluzas
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 16, 2008 appealing from the Office action mailed July 24, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

3,528,842	SKADULIS	9-1970
4,378,408	JOEDICKE	3-1983
3,918,407	GREENBERG	11-1975
3,507,676	MCMAHON	4-1970

4,430,108	HOJAJI ET AL	2-1984
4,145,400	ADSETTS	3-1979
3,961,628	ARNOLD	6-1976
5,876,752	HERBIG RT AL	3-1999
5,888,930	SMITH ET AL	3-1999

(9) Grounds of Rejection

Information Disclosure Statement

The information disclosure statement filed with the current Brief has been fully considered. An initialed copy of said IDS is included herein.

The following ground(s) of rejection are applicable to the appealed claims:

Claims 3, 4, 7, 11, 16-21, 23, 28-32 and 36-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis (US 3,528,842) in view of Joedicke (US 4,378,408).

Skadulis discloses a process for producing algae-resistant roofing granules, the process comprising applying to raw mineral granules (claimed inert base particles) (See column 3, lines 44-46) ceramic *porous* coatings (See column 2, lines 41-44; column 3, lines 51-53) by applying a coating composition containing *kaolin and sodium silicate* (claimed binder), algicide such as Cu_2O (claimed cuprous oxide) (See column 2, lines 40-47), appropriate *pigments*, generally metal oxides, to impart the desired color to the coating, then firing at 800^0C -1000 ^{0}F (**427-538^{0}C**) thereby forming a moisture permeable porous pigmented silicate-clay coating (See column 2, line 71 to column 3, line 57). The water-insoluble algicidal copper compounds become soluble under acidic conditions and are released from the porous silicate-clay coating in an amount effective to prevent growth of algae on the surfaces (See column 2, lines 55-70). The

ceramic porous coatings may be formed, for example, in **two layers** using processes described in Examples I and III. In **Example I**, coated granules are formed by applying to granules a **first** coating composition containing a mixture of kaolin/sodium silicate binder, **TiO_2** pigment (claimed transition metal oxide), pre-drying and firing at 950^0F thereby forming colored pre-coated granules (claimed first intermediate particles), then applying to the *colored* pre-coated granules a **second** coating composition containing a mixture of kaolin/sodium silicate binder, **TiO_2 pigment**, **Cu_2O** in an amount of 2 wt % (See column 4, line 39), and firing at 700^0F thereby forming slightly *reddish off-white* colored granules (claimed second intermediate particles) (See Examples I, column 4, lines 11-49). In **Example III**, coated granules are formed by applying to granules a coating composition containing a mixture of kaolin/sodium silicate binder and **Cu_2O**, and firing at 950^0F thereby forming colored pre-coated granules (claimed **first** intermediate particles having algaecidal material, as required by claim 3), then applying to the pre-coated granules a **second** coating composition containing a mixture of kaolin/sodium silicate binder, **TiO_2 pigment** (See column 5, lines 30), and firing at 910^0F thereby forming *bluish grey* colored granules (claimed second intermediate particles) (See Examples III, column 5, lines 14-33). Thus, Skadulis teaches that: water-insoluble algicidal copper compounds such as Cu_2O (claimed cuprous oxide) in an amount of 2 wt % (See column 4, line 39) may be added to the *first layer* (claimed first intermediate particles) (See Example III) or to the *second layer* (claimed second intermediate particles) (See Example I); and **TiO_2** pigment may be added *either* to both **first** and second layers (See Example I) or to outer layer only (See Example III) depending on the desired color of the coated granules.

Skadulis fails to teach that the first layer further contains a void-forming material that release gaseous material at temperatures above 90^0C, and have an average particle size no larger than 2 mm, which form pores upon firing, and the second layer does not have a void-forming material (Claims 3 and 28).

Joedicke '408 teaches that kaolin clay is used extensively in silicate paint formulations for coloring roofing granules as filler, extender, moisture release agent and reactant to aid film insolubilization during high temperature firing (See column 1, lines 17-22). Impurities in kaolin clay cause grey coloration, such that white colored roofing granule insolubilized alkali silicate coatings using natural kaolin clay frequently require appreciable amounts of expensive TiO_2 to

achieve desired white or **light** color (See column 1, lines 33-42). However, the pigment requirements in silicate-clay coating formulations, particularly expensive TiO_2 in white coatings, can be reduced by increasing the opacity, or hiding power, of the coating itself (See column 2, lines 17-26) by adding inexpensive gas-forming compounds such as hydrogen peroxide, sodium perborate ($NaBO_3$) to the silicate-clay coating (See column 2, lines 40-52). Inclusion of gas forming compounds in silicate coatings for roofing granules results in extraordinary *lightening* of the fired coating, which is due to decomposition of the dissolved gas forming compounds to form light scattering *microvoids* (**i.e. gas-forming particles should have claimed particle size of less than 2 mm to produce microvoids**) that greatly enhance the whiteness and opacity of the silicate coating (See column 4, lines 18-26), and afford *significant pigment reductions, particularly TiO_2 in whites* (See column 3, lines 1-3). The granules may be coated in one or more coats with any desired amount of coating material and the gas forming compound may be used in ***any*** one or more of the **coatings** (See column 5, lines 38-41). Gas forming compound is **preferably** used in the *outer* coating (See column 5, lines 41-58). However, it is well settled that patents are relevant as prior art for all they contain. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or **nonpreferred embodiments**. See MPEP 2123. Therefore, the teaching of Joedicke '408 can be interpreted that in *non-preferred* embodiments of, a gas-forming compound is added to *any* inner layer including the *innermost* TiO_2 pigment containing layer of the multiple coating layers and still it will enhance film opacity and will afford significant TiO_2 pigment reduction because Joedicke '408 teaches that the gas-forming compound may be added to any layer and Joedicke '408 does not limit its teaching to the use of the gas-forming compound in outermost layer only.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added inexpensive gas-forming compounds to the **first** layer of Skadulis containing a TiO_2 pigment with the expectation of providing the desired light color at significant TiO_2 pigment reduction, as taught by Joedicke '408.

As to pore size, thickness and concentration limitations, clearly, the color of final granules would depend (in addition to other parameters) on these limitations. It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine

experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant pore size, thickness and concentration parameters (including those of claimed invention) in Skadulis in view of Joedicke '408 depending on particular use of a final product through routine experimentation in the absence of showing of criticality.

As to claims 3, 4, 7, 11, 16-21, and 23, Skadulis teaches a coating composition containing kaolin (which is known to be **aluminosilicate**) and sodium silicate.

Claims 3, 4, 7, 11, 16-21, 23, 28-32 and 36-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis, as applied above, in view of Greenberg (US 3918407).

Skadulis fails to teach that first layer further contains a void-forming material that release gaseous material at temperatures above 90^0C, and have an average particle size no larger than 2 mm, which form pores upon firing, and the second layer does not have a void-forming material (Claims 3 and 28).

Greenberg teaches that release rate of toxicant (See column 1, lines 9-12) can be controlled by controlling texture and porosity of a solid heat-cured carrier by incorporating into the carrier before heat-curing a predetermined amount of heat decomposable gas forming particles (See column 3, lines 55-64; column 7, lines 66-67). The internal porosity, texture and surface porosity of the carrier must be sufficiently coordinated to allow a sufficient release of the toxicant from the carrier (See column 3, lines 58-61). Note that Greenberg is not nonanalogous art, since it is reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Greenberg is reasonably pertinent to the problem of controlling release of a toxicant from a *porous carrier*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated particles of heat decomposable gas forming compound to a coating composition of a *toxicant containing first layer* in Skadulis with the expectation of providing the desired release rate by controlling texture and porosity of the layer with the use of

particles of gas forming heat decomposable compound, as taught by Greenberg. Obviously, the pore size would depend on particle size of heat decomposable gas forming compound.

As to particle size of heat decomposable gas forming compound, pore size, thickness and concentration limitations, it is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant particle size, pore size, thickness and concentration parameters (including those of claimed invention) in Skadulis in view of Greenberg through routine experimentation in the absence of showing of criticality.

As to thickness limitations of claim 28, in a bi-layer granules of Skadulis, each layer is sufficiently porous to permit *some* moisture to permeate the same (i.e. both layers have very low porosity) (See column 3, lines 51-54). Obviously, a first layer of Skadulis should be thick enough to contain a sufficient amount of algicide. Therefore, it would be obvious to one of ordinary skill in the art to include a gas forming compound into a thick first layer using a method of Greenberg and control a release rate by adjusting a thickness of the outer layer by routine experimentation, e.g. in claimed range, as required by Claim 28, depending on particular application in the absence of showing of criticality.

Claims 12-13 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke '408 or Skadulis in view of Greenberg, as applied above, and further in view of McMahon (US 3,507,676).

The cited prior art fails to teach that a combination of cuprous and zinc oxide (ZnO) is used as an algicidal agent (Claim 12).

McMahon teaches that ZnO is suitable for the use as algicide in coating of roofing granules (See column 1, lines 14-15).

It is well settled that it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a combination of cuprous and zinc oxide as an algicidal agent in the cited prior art since McMahon teaches that ZnO is suitable for the use as algicide in coating of roofing granules.

Claims 14-15 , and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke '408 or Skadulis in view of Greenberg, as applied above, and further in view of Hojaji et al (US 4,430,108).

The cited prior art fails to teach that sugar is used as gas-forming material.

Hojaji et al teach that sugar is suitable for the use as gas-forming material (See column 8, lines 47-57) in glass compositions for roof shingles (See column 4, lines 19-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a sugar as gas-forming material in the cited prior art since Hojaji et al teach that sugar is suitable for the use as gas-forming material in glass compositions for roof shingles. It is held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Adsetts (US 4,145,400) is applied here to show that kaolin is aluminosilicate (See column 3, lines 26-27).

Herbig et al (US 5876752) is applied here to show that the art related to a controlled release of active substance does not differentiate what is being released from a porous carrier: drugs, nutrients, plant growth regulators, fertilizers, biocides, insecticides, pesticides, pheromones, germicides, and such common uses as room deodorizers, pool chlorinators, flavors, fragrances and insect repellents. Herbig et al teaches devices for controlled release of active substances that can vary widely in nature such as drugs, nutrients, plant growth regulators, fertilizers, biocides, insecticides, pesticides, pheromones, germicides, and such common uses as room deodorizers, pool chlorinators, flavors, fragrances and insect repellents (See column 7,

lines 11-17) in the form of tablets, capsules and beads comprised of a porous substructure surrounded by one or more interfacial membranes which can be used in considerably different environments including human and animal bodies, soil, plant surfaces, air, aqueous medium and foods and beverages (See column 7, lines 8-10).

Arnold (US 3961628) is applied here to show that the release rate from a bi-layer can be controlled by adjusting porosity and thickness of each layer since the thicker and less porous layer the less release rate would be. Arnold shows that rate of diffusion of an active substance through a diffusive medium drug **generally** dependent on the solubility of the drug in the diffusive medium, the ***thickness and porosity*** of the release rate controlling material and the tortuosity factor (See column 6, lines 53-58).

Smith et al (US 5888930) is applied here to show that the rate of release of active ingredients from microporous beads may be controlled largely by the rate of diffusion through the relatively dense "skin" at the surface of each bead: increasing the thickness of this skin or reducing its porosity generally lowers the permeability of an active ingredient through the skin, and so lowers its release rate (See column 7, lines 46-51).

(10) Response to Argument

Appellants' arguments filed the current Brief have been fully considered but they are not persuasive.

Appellants assert that a key issue in this appeal is the correct reading of Joedicke and Skadulis. The Examiner reads a single sentence in Joedicke literally; but fails to read Joedicke as a whole for what it would impart to one of ordinary skill in the art. Applicants contend that the correct reading is that which a person of ordinary skill would understand from Joedicke, taken as a whole. Simply put, Joedicke introduces microvoids into the coating layers covering roofing granules for the purpose of scattering light, so as to be able to reduce the amount of expensive white titanium dioxide pigment otherwise required. Applicants contend that one of ordinary skill in the art would understand that it would be useless to introduce microvoids into invisible inner layers, since such layers could not scatter incident light. Applicants' reading of Joedicke is supported by the evidence of record, namely, the **declaration of Dr. Keith Hong** (Evidence Appendix, Exhibit A, Declaration Under Rule 132, paragraph 7). The Examiner focuses on a single sentence in Joedicke that states that "Granules may be coated in one or more coats with any desired amount of coating material and gas forming compound may be used in any one or more of the coatings." (col. 5, lines 38-42). The Examiner's position is contradicted by of the

common sense understanding of one of ordinary skill in the art of the disclosure of Joedicke as a whole. The Examiner takes a similar incorrect view of Skadulis.

The Examiner respectfully disagrees with this argument. In contrast to Appellants argument, the Examiner relied Joedicke, taken as a whole, and does not focus on a single sentence in Joedicke that states that "Granules may be coated in one or more coats with any desired amount of coating material and gas forming compound may be used in any one or more of the coatings." Joedicke teaches introducing microvoids in any layer ***preferably*** into outer layer (See column 5, lines 40-42) and in ***particularly preferred*** embodiment, to the outer layer of two-layer coating (See column 5, lines 44-55). Thus, Joedicke, taken as a whole, does not limit its teaching to the outer layer only such that in *non-preferred* or *non-particularly preferred* embodiment microvoids can be added to any layer including inner layer.

Further, the Examiner agrees with Appellants that one of ordinary skill in the art would understand that it would be useless to introduce microvoids into **invisible** inner layers, since such layers could not scatter incident light. However, the first layer in Skadulis could hardly be called "invisible" inner layer because Skadulis adds TiO_2 pigment to the first layer in an amount of **12 parts** that is *slightly* less than 16 parts of TiO_2 pigment added to the second outer layer, in order to achieve **off-white** colored coated granules (See Example I). In the case of **gray** colored coated granules, Skadulis adds TiO_2 pigment to the outer layer only (See Example III). Therefore, the color of the first layer seems to be *visible* through the outer second layer.

In any case, since Skadulis requires addition of TiO_2 pigment to the first layer to achieve **off-white** colored coated granules, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have introduced microvoids into the first coating layer of Skadulis containing TiO_2 pigment so as to be able to achieve **off-white** colored coated granules at reduced amount of expensive white titanium dioxide pigment.

Thus, in contrast to Appellants statement, the Examiner based her rejection of correct reading of Joedicke and Skadulis, both taken as whole.

DECLARATION UNDER RULE 132 (37 C.F.R, § 1,132)

Declaration filed on January 15, 2007 has been fully considered but it is not persuasive.

Mr. Keith Hong states that since Applicants' algaecide containing coating and commercial algae-resistant granules are typically gray in color, reflecting the use of carbon black in the coating compositions (shown in Exhibits A and B), one of ordinary skill in the art would not be motivated to add a void-forming material such as hydrogen peroxide or sodium perborate to the inner coating composition material in the process of the present invention, simply because increasing the "opacity" of the coating composition would require additional pigment, rather than less as in the case of white or light-colored materials, and would not improve the appearance of the granules (See paragraphs 4-6). Inclusion of gas forming compounds into silicate coatings of Skadulis would be more effective if it is included into the outer layer. Inclusion of gas forming compounds into silicate coatings of Skadulis may not work because of dark colored coatings absorb light rather than reflect light.

The Examiner respectfully disagrees with this argument. It is held that rationale different from applicant is permissible. The reason or motivation to modify the reference may often suggest what the inventor has done, but for a *different purpose or to solve a different problem*. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. In re Linter, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972) (discussed below); In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 904 (1991). Therefore, it is irrelevant whether Applicants' algaecide containing coating and commercial algae-resistant granules are typically gray in color or not.

As to other arguments, the Examiner respectfully disagrees with this argument for the reasons discussed above.

A. The Cited Combination of Skadulis and Joedicke Do Not Make Out a Prima Facie Case of Obviousness with Respect to Claims 3, 4, 7, 11, 16-20, 23, 28-32 and 36-41

i. Appellants argue that in making her rejection, the Examiner stated that the outer layer of Skadulis carrying no algaecide may be formed as a very thin layer so that it would not cover the color of the first layer (Examiner's Action dated March 6, 2007, page 2, Paragraph 2). This is simply speculation on the part of the Examiner. There is nothing in the reference cited which supports the Examiner's speculation. The Examiner's speculation is contrary to the common sense expectation of one of ordinary skill in the art. Skadulis does not even discuss forming multiple coating layers, but merely includes three working examples in which two layers were formed. **In each of the three examples, Skadulis discloses adding titanium dioxide to the *outer* layer to color the layer** (emphasis is added by the Examiner). There is nothing in Skadulis to suggest that the titanium dioxide should or could be omitted. In addition, in both layers and in each example, the coating binder is sodium silicate with kaolin clay dispersed therein. Because Skadulis requires a coating sufficiently porous to permit leaching of metal ions

from the granule coating, Skadulis employs as a binder sodium silicate and clay which is filed to a temperature above the dehydration point of the sodium silicate but below the melting point of the clay (col. 3, lines 16 - 32). A discussion of physical changes that occur during the drying and firing of clay is provided in Chapter 4 of D. Rhodes, Clay and Glazes for the Potter (Chilton Book Company, Radnor, PA, 1973, Evidence Appendix, Exhibit B). Skadulis expressly rejects using prior art methods, such as disclosed in U.S. Patent 1,782,649, which provide impermeable glazes (col. 3, lines 54-60). Because Skadulis fires his coatings to temperatures below the melting point of the clay, one of ordinary skill in the art would expect that the clay in the insoluble coatings to be in the form of a light-scattering, crystalline particulate. Contrary to the Examiner's speculation, one of ordinary skill in the art would have no reason to expect that such a coating would become transparent no matter how thinly it is applied.

The Examiner respectfully disagrees with this argument. First of all, in contrast to Applicants statement, Skadulis adds TiO_2 not into outer layer only but also into inner layer (See Example I). Even without relying on Examiner's speculation of "thinly applied layer", it would be obvious to add microvoids into inner layer because Skadulis teaches that TiO_2 has to be added to the inner layer as well to achieve off-white colored coated granules (See above).

ii. Appellants argue that the properly framed issue is not whether Joedicke is relevant to Skadulis, but whether Skadulis and Joedicke are relevant to the presently claimed in invention. The Examiner's response to Dr. Hong's point that the combination of Skadulis and Joedicke would not be relevant to the production of dark-colored granules is similarly off the point. The evidence of record is that one of ordinary skill in the art would understand that the formation of microvoids, such as disclosed by Joedicke, for the purpose of lightening the coating of roofing granules, would be detrimental to the appearance of dark colored, copper containing granules, such as those produced by the process claimed in Claims 3, 4, 11-20 and 23 (Evidence Appendix, Exhibit A, Declaration Under Rule 132, paragraph 8). Consequently, Joedicke does not suggest the formation of microvoids in such copper containing roofing granule coatings. The combination of Skadulis and Joedicke fails to make out a prima fade case of obviousness. The rejection over Skadulis in view of Joedicke should be reversed for these reasons.

The Examiner respectfully disagrees with this argument. First of all, claims do not require dark colored granules. Second it is held that rationale different from applicant is permissible. The reason or motivation to modify the reference may often suggest what the inventor has done, but for a *different purpose or to solve a different problem*. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. See MPEP 2144. Thus, the evidence of record is that one of ordinary skill in the art would understand that the formation of microvoids, such as disclosed by Joedicke, for the purpose of lightening the coating of roofing granules, would be detrimental to the appearance of

dark colored, copper containing granules, such as those produced by the process claimed in Claims 3, 4, 11-20 and 23 is utterly irrelevant because Claims 3, 4, 11-20 and 23 are not directed to **dark** colored, copper containing granules. Third, Skadulis teaches expressly that coated granules having *cuprous oxide* in outer layer may be made of *off-white* color by adding TiO2 to both layers (See Example I).

B. The Rejection of Claims 3, 4, 7, 11, 16-20, 23, 28-32 and 36-41 Over The Combination of Skadulis and Greenberg Should Be Reversed

1. The Cited Combination of Skadulis and Greenberg Is Improper and Cannot Render Claims 3, 4, 7, 11, 16-20, 23, 28-32 and 36-41 Obvious

a. The Secondary Reference Greenberg Is Non-analogous Art

In making her final rejection, the Examiner reconstructs applicants' invention by agglomerating references from two different, unrelated arts. Since the secondary reference the Examiner relies upon is neither in the same field of endeavor (producing roofing granules) nor reasonably pertinent to the problem of providing long tem algae resistance, her rejection is not based on the relevant prior art, and she has not made a prima facie case of obviousness.

The argument is unconvincing because Greenberg is reasonably pertinent to the particular problem with which the inventor is involved: claimed invention relates to a problem of releasing a **toxicant** through carrier pores. Greenberg resolves the same problem of releasing **toxicant** through carrier pores. Therefore, Greenberg is **reasonably pertinent** to the particular problem with which the applicant was concerned. Thus, in contrast to Applicants argument, Greenberg is analogous art. It should be noted that the art related to a controlled release of active substance does not differentiate what is being released from a porous carrier: drugs, nutrients, plant growth regulators, fertilizers, biocides, insecticides, pesticides, pheromones, germicides, and such common uses as room deodorizers, pool chlorinators, flavors, fragrances and insect repellents, as evidenced by Herbig et al (US 5876752) teaching devices for controlled release of active substances that can vary widely in nature such as drugs, nutrients, plant growth regulators, fertilizers, biocides, insecticides, pesticides, pheromones, germicides, and such common uses as room deodorizers, pool chlorinators, flavors, fragrances and insect repellents (See column 7, lines 11-17) in the form of tablets, capsules and beads comprised of a porous substructure

surrounded by one or more interfacial membranes which can be used in considerably different environments including human and animal bodies, soil, plant surfaces, air, aqueous medium and foods and beverages (See column 7, lines 8-10).

b. Greenberg Relates to a Different Field of Endeavor

The present invention and Skadulis each relate to the same general field of endeavor - protective granules for roofing. As stated in the "field of the invention" section of the application on appeal, "[t]he present invention relates to asphalt roofing shingles, protective granules for such shingles, and process for making such granules and shingles" (page 1, line 10-11).

As was discussed above, a prior art reference must *either* be in the field of applicant's endeavor *or*, if not, then be *reasonably pertinent to the particular problem* with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Greenberg is *reasonably pertinent to the particular problem* with which the applicant was concerned. Thus, it is irrelevant whether Greenberg is in the field of applicant's endeavor or not.

c. Greenberg Is Not Reasonably Pertinent to the Problem Solved by the Present Invention

i. The Examiner contends that Greenberg is reasonably pertinent to the particular problem with which applicants were concerned. However, this is not correct. The particular problem of the present invention at hand involves algae growth on roofs by release of sparingly soluble metal ions. Greenberg does not attempt to resolve any such problem, but rather the problem of continuous release of a volatile gaseous insecticide having a low vapor pressure from plastic flea collars.

The argument is unconvincing because Appellants and Greenberg relate to the same problem of controlled release of toxicant over a prolonged period of time from a porous carrier.

ii. The Examiner attempts to bootstrap her position by asserting that the "art of a controlled release of an active substance does not differentiate what is being released from a porous carrier" reciting a wash list of "active substances" recited in U.S. Patent 5,876,752 ("Herbig et al.") (Examiner's Action dated July 24, 2007, page 6, first paragraph). The Examiner reasoning here is not correct. Herbig et al. discloses a very special kind of "porous carrier," namely "a tablet, capsule or bead for administration to a mammal which releases one or more pharmaceutically active substances into said animal over an appreciable time interval which comprises a core of said active substance or substances, with or without one or more pharmaceutically acceptable excipients, said core being surrounded by a porous substructure and one or more IF (i.e. "interfacially polymerized") membranes" (col. 2, lines 24 - 31).

The argument is unconvincing. Herbig et al shows that **fields as remote** as drugs and fertilizers are united by the same problem of releasing an active compound from a porous carrier. Therefore, solving problems related to controlled release of algaecidal compound in roof granules relate to controlled release of drug in animal collar.

> iii. Similarly, Greenberg is presently classified in U.S. class 119, "animal husbandry." The present application has been classified in U.S. class 52, "static structures (e.g., buildings)." These arts are wholly unrelated. The Examiner argues that it is well settled that references do not have to be classified by the PTO in the same class to be pertinent, citing In re Mlot-Fijalkowski, 213 USPQ 713 (CCPA 1982) (Examiner's Action dated July 24, 2007, page 9, first paragraph). However, applicants merely contend that the difference in classification is some evidence that Greenberg is not pertinent to the problem addressed by applicants. Greenberg is not analogous prior art.

The argument is unconvincing because as well settled that references do not have to be classified by the PTO in the same class to be pertinent, citing In re Mlot-Fijalkowski, 213 USPQ 713 (CCPA 1982), the difference in classification is no evidence that Greenberg is not pertinent to the problem addressed by applicants.

2. The Combination of Skadulis and Greenberg Does Not Make Out a Prima Facie Case of Obviousness with Respect to Claims 3, 4, 7, 11, 16-20, 23, 28-32 and 36-41

As in the case of the first rejection entered under Section 103(a), even if all the art relied upon by the Examiner were actually analogous art, the combination proposed by the Examiner fails to make a prima facie case of obviousness. Even if Greenberg were part of the content of the relevant prior art, the Examiner's suggested combination with the Skadulis would not render the presently claims obvious. Greenberg solves his (unrelated) problem by increasing the surface porosity of the flea collars (col. 5, lines 17-28): "The main function of the additive is to provide a surface porosity which preferably includes pores extending part way down into the body of the collar." This is achieved by employing an additive which has a boiling point at or below the curing temperature of the polyvinylchloride resin. Adding some low boiling additive to increase the surface porosity of roofing granules would not provide the presently claimed invention - the porosity of the outer layer that forms the surface would be increased - not that of the inner layer. Thus, the combination of Skadulis and Greenberg fails to establish a prima facie case of obviousness.

The Examiner respectfully disagrees with this argument. Greenberg teaches controlled release of toxicant (See column 1, lines 9-12) from a **single** layer of resin by controlling texture and porosity of a solid heat-cured carrier by incorporating into carrier before heat-curing a predetermined amount of heat decomposable gas forming particles (See column 3, lines 55-64;

column 7, lines 66-67). Greenberg broadly teaches that the **internal porosity**, texture and **surface porosity** of the carrier must be sufficiently coordinated to allow a sufficient release of the toxicant from the carrier (See column 3, lines 58-61). One of ordinary skill in the art would easily recognize that release rate from a bi-layer can be controlled by adjusting porosity and thickness of each layer since the thicker and less porous layer the less release rate would be, as evidenced by **Arnold** (US 3961628) showing that rate of diffusion of an active substance through a diffusive medium drug **generally** dependent on the solubility of the drug in the diffusive medium, the ***thickness and porosity*** of the release rate controlling material and the tortuosity factor (See column 6, lines 53-58) and **Smith et al** (US 5888930) showing that the rate of release of active ingredients from microporous beads may be controlled largely by the rate of diffusion through the relatively dense "skin" at the surface of each bead: increasing the thickness of this skin or reducing its porosity generally lowers the permeability of an active ingredient through the skin, and so lowers its release rate (See column 7, lines 46-51). In a bi-layer granules of Skadulis, each layer is sufficiently porous to permit *some* moisture to permeate the same (i.e. both layers have very low porosity) (See column 3, lines 51-54). Obviously, a first layer of Skadulis should be thick enough to contain a sufficient amount of algicide. Therefore, it would be obvious to one of ordinary skill in the art to include a gas forming compound into a thick first layer using a method of Greenberg and control a release rate by adjusting a thickness of the outer layer which could be in claimed range, as required by Claim 28 depending on particular use of a final product.

C. The Cited Combination of References Do Not Make Out a Prima Facie Case of Obviousness with Respect to Claims 12, 13 and 33

Claims 12, 13 and 33 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke, or Skadulis in view of Greenberg, and further in view U.S. 3,507,676 ("McMahon"). As in the case of the first and second rejections entered under Section 103(a), even if all the art relied upon by the Examiner were actually analogous art, the combination proposed by the Examiner still fails to make a prima facie case of obviousness. Even were the references combined as suggested by the Examiner, there would be nothing to teach or suggest to one of ordinary skill in the art to include void-forming material in the inner coating layer but not in the outer coating layer of roofing granules containing cuprous oxide, or to the inner coating layer of roofing granules have an opaque outer layer. McMahon does not add

anything to the combination of Skadulis in view of Joedicke in this regard, or to Skadulis in view of Greenberg.

The Examiner respectfully disagrees with this argument. The Examiner has established a prima facie case of obviousness over Skadulis in view of Joedicke, or Skadulis in view of Greenberg for the reasons discussed above. A secondary reference of McMahon is relied upon to remedy Skadulis not for void-forming material but to show that ZnO is suitable for the use as algicide in coating of roofing granules.

D. The Cited Combination of References Do Not Make Out a Prima Facie Case of Obviousness with Respect to Claims 14-15 and 34-35

Claims 14-15 and 34-35 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke, or Skadulis in view of Greenberg, and further in view of U.S. Patent 4,430,108 ("Hojaji"). As in the case of the first, second, and third rejections entered under Section 103(a), even if all the art relied upon by the Examiner were actually analogous art, the combination proposed by the Examiner still fails to make a prima facie case of obviousness. Applicants contend that Hojaji does not supply the teaching or suggestion missing from the combination of Skadulis and Joedicke, or of Skadulis and Greenberg, that void-forming material be included in the inner layer composition but excluded from the outer layer composition in either a composition including cuprous oxide or a roofing granule with an opaque outer layer. Consequently, the cited combination of prior art references does not make a prima fade case of obviousness of the claims as presently amended.

The Examiner respectfully disagrees with this argument. The Examiner has established a prima facie case of obviousness over Skadulis in view of Joedicke, or Skadulis in view of Greenberg for the reasons discussed above. A secondary reference of Hojaji is relied upon to remedy Skadulis not for void-forming material but to show that Hojaji et al teach that sugar is suitable for the use as gas-forming material in glass compositions for roof shingles. The cited combination of references thus does establish a prima facie case of obviousness in respect of the presently claimed invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Elena Tsoy Lightfoot /

Primary Examiner, Art Unit 1792

Conferees:

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700

/Timothy H Meeks/

Supervisory Patent Examiner, Art Unit 1792